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ABSTRACT

Teachers who implement new programs have often been observed to adapt them to suit their own teaching situations. This process of adaptation raises four important issues: (1) Can teachers replicate practices developed elsewhere? (2) Can they be equally effective in doing so? (3) Must adaptation occur for implementation to succeed? and (4) Can different kinds of adaptation be discerned, some valued and others not? To address these questions, this paper examines four studies of the change process whose research questions or findings pertain to the replication/adaptation issue: (1) the survey component of the Study of Dissemination Efforts Supporting School Improvement (a study of innovative practices supported by federal programs); (2) the field study component of this same study; (3) the Rand Change Agent Study (an examination of federal "seed money" programs); and (4) the SRI International Study of the National Diffusion Network. For each of these studies, an effort is made to ascertain how the innovation was defined, identify sources of information used to determine fidelity, define the unit of analysis, and summarize the findings. Thereafter, a cross-study examination is presented to discuss the differences in the above studies and to assess the ways in which they have collectively contributed to a better understanding of school improvement practices. (TE)

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DEFINING FIDELITY:

A CROSS-STUDY ANALYSIS

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Defining Fidelity: A Cross-Study Analysis

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In the mid-1970s, researchers began to document what educators had known for many years: that teachers implementing new programs or practices -- innovations -- changed them to suit their own teaching situations. The same innovation being used throughout a school looked different from one classroom to the next. At the Texas R&D Center, these various adaptations, refinements, mutations showed up in our study of the change process, and we labeled them "innovation configurations" (Hall & Loucks, 1978). The Rand Change Agent Study found that such changes were key to successful implementation; a "mutual adaptation" strategy, where both the innovation and the organization were changed, was found to be optimal (Berman & McLaughlin, 1975).

In the late 1970s, I observed these findings penetrating the community of practicing educators far more rapidly than any previous research results. Perhaps this was because the findings were communicated widely through many media, particularly those that were used by practitioners. An article in Teachers College Record (McLaughlin & Marsh, 1978) became "must reading" for school district administrators, staff developers and curriculum coordinators (Czajkowski & Patterson, 1980). Perhaps also these findings were congruent with what most practitioners believed, that no two learning situations are alike, and that no program developed in one place can be used "as is" in another.

Whatever the reason, "adaptation" became a byword. My experiences in two well-regarded school districts are a case in point. In one, a "new" elementary mathematics program was developed internally by setting objectives and developing resource books, which were collections of lessons and activities contributed by the district's teachers. The resource guides were distributed and teachers were encouraged to "adapt them to their own classrooms." This was labeled an "adaptive" strategy.

In another district, a very sophisticated curriculum development process resulted in an elementary science curriculum that combined the best of the 1960s "process" curricula with district-developed objectives and units. After intense teacher training and delivery of required equipment and materials to each school, teachers were found to be deleting units with "live things" ("they're too messy") and lecturing about concepts that units painstakingly developed through a variety of "hands-on" activities. This, the teachers said, and many of their principals concurred, was "adapting the curriculum to their own situation."

These experiences raised important issues about adaptation. Other experiences with the National Diffusion Network, a federal program based on the assumption that practices that work in one setting can be equally successful in others if their key features are replicated, piqued my interest in the issues surrounding

replication. There are many such issues, and they are raised by practitioners, policy-makers and researchers alike. Can teachers replicate practices developed elsewhere? Can they be equally effective? Must adaptation occur for implementation to succeed? Can different kinds of adaptations be discerned and some valued and some not?

The paths to answering these questions are many. Perhaps there are no answers, and every change effort needs to define its innovation and deal with questions of adaptation individually and independently. But before giving in to this course of action, we can look for some answers. One of the keys is in response to the question: is the replication/adaptation argument purely semantic? That is, are people who argue one side or the other talking about the same thing?

This paper seeks to answer this question. In it, I examine four studies of the change process whose research questions and/or findings dealt with the replication/adaptation issue. I include:

1. The survey component of the Study of Dissemination Efforts Supporting School Improvement.

2. The field study component of this same study.

3. The Rand Change Agent Study.

4. The SRI International Study of the National Diffusion Network.

For each study I ask:

1. How did they define what was being implemented; i.e., the innovation?

2. What sources of information did they use to determine fidelity?

3. What unit of analysis was used?

4. What did they find (briefly)?

Finally, I attempt to explain why their findings differed, when they did.

The Study of Dissemination Efforts Supporting School Improvement (DESSI): Survey Component

Conducted by The NETWORK, Inc. and several collaborating institutions, this study examined schools and classrooms in 146 districts across the country that had been involved in using innovative practices supported by four federal programs: the National Diffusion Network, the Bureau of Education for the

Handicapped's Market Linkage Program, State Administration of ESEA Title IV-C Adoption Grants, and ESEA Title IV-C Local Development Grants.

Definition of the Innovation. The 61 innovative practices examined by the study were defined by developing a standardized description of each called a Practice Profile (Loucks, Bauchner, Crandall, Schmidt, & Eiseman, 1982; Loucks & Crandall, 1982). The first part of the Practice Profile described the practice according to eight characteristics: purpose, pedagogical approach, complexity, implementation requirements, size, prescriptiveness, precision of definition, and concreteness of claimed benefits. The second part of the Practice Profile was a Component Checklist. Derived from the concept of Innovation Configurations developed at the Texas R&D Center for Teacher Education (Hall & Loucks, 1978), the checklist was intended to delineate the key parts or components of the practice, and describe various ways the components might be used. The checklist not only depicted how the practice might look in the classroom, but also allowed judgments to be made about how close that use was to the developer's picture of how the innovation should look. Figure 1 is an example of a Component Checklist.

Component Checklists were developed through a process that included examining practice materials, interviewing developers, and observing and interviewing users. Care was taken to develop component and variation descriptions that were clear and unambiguous, and that had similar scope or weight in practice.

Scores for each component were given according to the acceptability of the vatiation in use:

3 = ideal
2 = acceptable
1 = unacceptable, but present
0 = absent

The four variables measured using Component Checklists included fidelity, which was defined as the extent to which the user's current practice matched the developer's "ideal." It was computed as follows:

$$\text{fidelity} = \frac{\text{sum of component scores}}{3 \times \text{number of components}}$$

This computation resulted in scores ranging from zero to one, with one being an ideal replication.

Sources of Information. To assess fidelity, innovation users (usually teachers) were interviewed. These were "first line" users -- those designated by district or building level contacts as using the innovation in their classrooms. Two such users were interviewed in all sites except those in which National Diffusion Network practices were adopted, where up to six users were included.

Unit of Analysis. The unit of analysis was the individual user.

Findings. The study found a high degree of fidelity across the 296 users who provided complete data. Twelve percent of the users scored 1.0. The average score was 0.80. This means that the average user was implementing components using variations either acceptably or ideally (if each component was rated "acceptable" the fidelity score would be 0.67) (Loucks, Cox, Miles, & Huberman, 1982). Fidelity was found to be related to the amount of change that occurred in the teacher's practice; however, no analyses were conducted of the contribution of fidelity to the ultimate outcome: overall benefits of the practice.

The Study of Dissemination Efforts Supporting School Improvement (DESSI): Field Study Component

The field study component of the larger dissemination study, conducted by Michael Huberman and Matthew Miles (1982), focused on a subset of twelve of the study's 146 districts. In the twelve districts, new practices had been implemented with the support of either the National Diffusion Network or ESEA Title IV-C Development Grants.

Definition of the Innovation. Field researchers used Component Checklists developed for the survey component as the primary definition of the twelve innovations. In addition, they read all available documents, including descriptions of the NDN projects in Educational Programs that Work, brochures, flyers, and proposals. Some information was collected from Title IV-C participants through interviews.

Sources of Information. The field study's focus on "transformations" of the innovation involved broad-based data collection over the course of a full school year. Field researchers used structured and informal interviews; observations of meetings, classrooms and other interactions; study of all documents with potential relevance; and examination of survey data (questionnaires, interviews, Component Checklists). Data were collected from teachers (including innovation users, nonusers, past users), administrators at all levels, pupils, and program personnel, often from several buildings within the district.

Unit of Analysis. The field study aggregated findings from innovation users into a site-level judgment of changes in the innovation.

Findings. The field study found that at the end of three years, or at the close of data collection in sites with shorter implementation histories, seven of the twelve sites had dropped or

changed from one-third to two-thirds of the key components* to "unacceptable" variations. Three sites had such changes in more than two-thirds of the components. Two sites had changed very little; they were implementing "ideal" versions of the developer's practice.

The kinds of changes and reasons they were made reflect the researchers' interest in understanding transformations over time:

> At the end of their third year, few [innovations] bore a strong resemblance to the developer's original design; the two innovations that did remain faithful were strictly monitored by building-level administrators acting on instructions from the central office. The others underwent changes at different moments as local actors responded to situational constraints. More often than not, these changes came early and consisted in reductions of the developer's format. Some were the result of minor tinkering, but most were sea changes. As time went on, there were further reductions and a more systematic pattern of reconfiguring, which usually meant that teachers returned to segments of their standard instructional repertoire that gradually replaced parts of the new practice-as-originally-designed.
>
> Sometimes, these changes were externally driven (as, for example, when the student population changes or a new curriculum crowded out the innovation). But more typically, they were willed by teachers and authorized by local administrators in a continuous, often implicit, process of bargaining, in which the building principal often played the intermediary between the central office and the school staff . . . .
>
> There were, of course, myriad reasons why an innovation changed or remained stable, changed early or late, or changed substantially for some and little for others at a given site. We found eight factors . . . . that seemed to predict the extent and direction of these changes, as follows:
>
> Goodness of fit for the user.
> Degree of classroom change implied by the practice.
> Degree of organizational change implied by the practice.
> Severity of the innovation's local "demands."
> Implementation readiness.
> Scale/scope of the innovation.
> Administrative latitude for making changes.

*Field researchers determined which of the components listed on the Component Checklist were "Key." Some were given greater weight, others were viewed as fairly trivial.

> It was notably the negotiation of latitude that came just before the ebb and flow of changes in these innovations, so we tried to be attentive to the local events sparking a new round of bargaining and to the instructional preconditions for further changes (Huberman & Miles, 1982, pp. 215-216).

How did these changes influence the "success" of the school improvement efforts? Huberman and Miles conclude that:

> In our sites, adaptation always took place -- but it was sometimes constrained by administrators' stout refusal to permit adaptation that would weaken or water down the innovation. Enforcing fidelity really paid off -- if it was accompanied by assistance. When adaptation went too far because of administrative "latitude," what often occurred was blunting/downsizing, trivialization, and weak student impact. Only in sites where there was strong user commitment, (and perhaps some degree of protection from environmental pressure through creation of a "subsystem"), did substantial adaptation <u>improve</u> the innovation (p. 473).

<u>Rand Change Agent Study (1973-74)</u>

This study examined several federal "seed money" programs, designed to introduce and spread innovative practices in public schools. The four "change agent" programs examined were: ESEA Title III, Innovative Projects; Title VII, Bilingual Projects; Vocational Education Act, 1968 Amendments, Part D, Exemplary Programs; and the Right-to-Read Program. A survey component involved 293 projects in 196 school districts in 18 states (Berman & Pauly, 1975); a case study component focused in on 29 projects in 25 school districts (Greenwood, Mann & McLaughlin, 1975).

<u>Definition of Innovation</u>. The "innovation" in this study was the project; only projects that involved changes in classroom activities were included. Projects were characterized by their resources (e.g., funding level, number of students), educational enrichment), and implementation strategies (e.g., planning, training, incentives). These project characteristics were treated as independent variables.

The dependent (outcome) variable called "fidelity of implementation" was "the extent to which the project was implemented as proposed (or laid out)." In this context, "the project" was undefined. In the survey it was left to the perception of project staff, who were asked:

> In general, to what extent would you say the project at your school has been implemented as initially laid out in the proposal? Would you say completely, somewhat, very little, or not at all?

In the case studies, case study researchers collected information on project characteristics as it was originally implemented, as it was at the time of the study, and as it had been adapted. Characteristics were: goals and objectives, treatment or means, emphasis among types of treatment, comparative utility of types of treatment, management characteristics, complexity of project, amount and extent of change required, and place where change was to occur. Researchers used this information to determine how the school affected the project ("adaptation") and how the project affected the school ("near-term behavioral change").

Source of Information. The survey component used a close-ended questionnaire to interview the district superintendent, federal program manager, and principals and two teachers from each of two project schools. Case study information came from interviews with these same people plus students, parents and other members of the community; document review; and observations during a one-week visit.

Unit of Analysis. In the survey component, teachers' responses to the question of fidelity were aggregated to provide a project score that could be correlated with other factors. In the case studies, researchers used all information gathered to make judgments about the kinds and degree of adaptations made in the originally implemented projects. Again, the data, this time qualitative, were aggregated to the project level.

Findings. The survey component found a high degree of fidelity of implementation. Over half (57%) of the teacher respondents reported that the project was implemented "completely" as it had been laid out; another 38% responded with "somewhat." The case study researchers, on the other hand, found a considerable amount of adaptation occurring and, in fact, concluded that to implement meant to adapt. "We found that regardless of project design or institutional setting, in the projects we observed, implementation was essentially an organized process characterized to a greater or lesser extent by mutual adaptation (Greenwood, Mann & McLaughlin, 1975, p. 28)."

Case study researchers found that

> the projects . . . were very different in their objectives, methods, and institutional setting, but the adaptations they made were often strikingly similar. Most projects made many or all of the following changes:
>
> - Reduction or modification of project goals
> - Amendment or simplification of project treatment
> - Reductions in the amount of behavioral change expected from participants
> - Reduction of expectations about the impact of the project
> - Changed organizational patterns
> - Learning new skills or attitudes

> However, the type and extent of mutual adaptation that is possible in a project depends on the project design, particularly on how complex and specific the methods and goals are, on how flexibly the project can cope with unanticipated implementation problems, and on the motivations of principal actors.
>
> The most extensive mutual adaptation took place in projects, such as open-classroom projects, that were highly complex, relatively unspecified in terms of treatment, and required a significant amount of change on the part of teachers and administrators . . . In contrast, those projects which exhibited the least mutual adaptation usually had simple, narrow goals and well-specified or purely technological treatments (Greenwood et al, 1975, pp. 29-30).

The central finding, then, was that where significant changes occurred in district practices, implementation of the projects was characterized by adaptation in the initial project design over time and by modificaton or change in the institutional setting and its members.

Evaluation of the National Diffusion Network

In 1975, the Stanford Research Institute began an in-depth study of the National Diffusion Network (NDN), a federal program for spreading exemplary practices to schools throughout the country (Emrick, Peterson, & Agarwala-Rogers, 1977). The study's goals were to describe the NDN and the processes it used to disseminate practices, and to evaluate its effectiveness.

Definition of the Innovation. The SRI researchers defined the innovation as the specific practice being disseminated by an NDN Developer/Demonstrator. The practice, referred to as the D/D's "project," involved both methods and materials. In the survey component of the study, there was no attempt to define the practice; D/Ds and adopters were simply asked questions about "the project." In the field visits to 34 adopters, researchers sought evidence of fidelity by looking for core components of the adopted practice identified in materials and conversations with the D/D. These components were not systematically defined or scaled, but rather formed a picture of what case study researchers could look for.

Source of Information. In the survey component, Developer/Demonstrators, primary contact people at adopting sites, and adopting teachers were asked about the extent to which changes had been made in the project's methods and materials. In the field component, researchers interviewed and observed adopters.

Unit of Analysis. Survey data were collected from individuals and were aggregated only to produce group means. It is not clear from study documentation whether or how field study data were aggregated.

Findings. The study found that implementation generally involves at least some modification of methods and materials to adapt the innovation to local conditions. Adopters were found to make modifications in "what they believe are reasonable ways." The survey found that less than 20% of the adopters reported modifying methods and materials to a very large extent. Rather, modification typically involved a variation in grouping, scheduling, or substituting reasonably equivalent curriculum materials for those described by the D/D.

Definition of the Innovation

If we are to understand what several studies say about fidelity in implementation, it's important to ask, "fidelity to what?" Here we find the studies not only defining the idea of an innovation quite differently, but also defining specific innovations in different ways. The two components of the DESSI study and the SRI study of the NDN were all looking at specific practices that were designed to be used by teachers in the classroom. (In some cases, such as a career education program, the innovation also included people in other roles working differently with students, but teachers were involved and classroom instruction was affected.) In the case of the Rand study, the "innovation" was the project. As noted by Datta (1980) in her criticism of the use of Rand findings to discourage the adoption of externally developed innovations, the projects Rand studied were loosely defined, developmental, non-specific approaches to changing schools to meet special needs. Guidelines for the various federal programs stressed local initiative, development and management, rather than changing specific classroom practices. As a result, not only were practices rarely defined enough so an outsider could see them or not see them in place, but they also changed continuously by design.

The answer to the question of "what is the innovation?" varied from study to study; so did the preciseness with which it was defined. Rand case study researchers used project proposals and participant descriptions to assess whether the "spirit" of the project was in place. In their survey, respondents were asked about whether the "project" had been implemented according to plan, with no prompting about how to define "the project." SRI researchers, although focused on something much narrower, more static and concrete, never sharply defined the NDN practices. Instead, they observed and interviewed field study participants about core components; their survey questions, like Rand's, did not focus respondents, asking them simply about changes made in the developer's "project" and leaving it undefined.

The DESSI study made the first attempt to carefully and crisply define each innovation it studied; in both field study and survey components, each teacher's use of the components of the practice was examined. Survey respondents were not asked generally about the practice as they had been in other studies; instead, in an interview that was later content-analyzed, each component was probed in detail, and a scoring procedure used that gave components equal weight. Field Study researchers, on the other hand, weighted checklist components as major and minor, and viewed additions to the components as transformations in the practice.

Thus there are both similarities and differences in how the studies defined "innovation" as well as how they defined "the" innovation at each school site.

Source of Information

Here again we see differences across studies. Both the Rand study case study component and the DESSI study field component collected data from a wide variety of sources in order to determine fidelity -- teachers, administrators, program directors and district personnel -- some not directly involved in implementation. The DESSI study and Rand study survey components, and the SRI study, used teacher data to determine fidelity. The DESSI study survey data were collected from two to six teachers at each site who were designated by contact persons as "users."

Unit of Analysis

The Rand study and DESSI study field components combined data from a number of sources to make a school or district level judgment of fidelity. Survey components of these studies and the SRI study made judgments of fidelity at the classroom level.

Findings

All three survey components found a moderately high degree of fidelity reported by teachers. The field components of the DESSI and Rand studies, which were focused much more on transformations and adaptations than on fidelity, found much change in the innovations. The Rand study equated such change with successful implementation; the DESSI study found such changes often detracted from project success.

Are these findings really as contradictory as they appear at first glance? Given the previous discussion, one could argue that it is impossible to know, for several reasons. First, the studies did not define the innovation in the same way. Rand defined it as a full-blown project; the others defined it as a precise classroom practice. The DESSI study survey defined several components, looked for only these in the sample, and gave them equal weight; the DESSI study field researchers, although they used the same components, made judgments about how important each was to the implementation giving them unequal weight, and considered additions to the core list as departures from fidelity. These definitional differences could certainly account for different findings.

Second, the unit of analysis was not the same. Rand and DESSI study field researchers described changes in the innovation; i.e., departures from fidelity, at the school and district level. At these levels, both studies found many significant changes. The DESSI study survey found a high incidence of core components in place; transformations made in the practices did not appear to have significantly altered these components. But these (minor) transformations were at the individual teacher level, and the

teachers in the sample had been chosen as primary users. When survey and field notes were compared for these same teachers, few differences were noted in how the components were being used. This validated the survey findings, while at the same time, pointed to where the "transformations" were occurring. When judging fidelity across the school, teachers were included who had not been involved in the original training, who had been trained formally in a second round of training by district staff, who had simply picked up parts of the practice from other teachers, and who had used the practice at one time, but were no longer doing so. Additions to the practices were also picked up by field researchers -- some that extended the practice's range, and others that blunted its effect by embedding it in traditional or other quite different practices. This expanded (perhaps "watered-down") sample and the inclusion of added components on the list of transformations greatly expanded the distance of the school or district from the developer's ideal version of the practice. So the unit of analysis did in fact account for a good many differences in findings.

This discussion could stop here. We could say that the important questions of fidelity (can it occur? can it contribute to successful school improvement?) cannot be answered at all, given "methodological inconsistencies" and "contradictory findings." But, let me give in to a temptation; I believe the findings lead in a general direction and some tentative conclusions can be drawn across the studies, regardless of the methodological differences.

Over the years, the school community, with support from federal programs, has gotten better at developing clear, well-defined practices that lead directly to school improvement. Early federal guidelines gave little structure to locally developed projects. As dissemination of these projects was given greater emphasis, and federal guidelines became more prescriptive in terms of classroom practice, local projects took on a clearer definition. As studies such as Rand gave practitioners ideas about what makes improvement efforts work (e.g., administrator support, training, follow-up), schools designed, implemented, and managed innovation better. Dissemination systems such as the NDN learned more about the importance of defining practices clearly, and of appropriate implementation assistance.

Thus, the education scene examined by the DESSI study was quite different from that studied by Rand. Rand looked for what was being done that was different and that was successful, and found that schools didn't stick to their plans and the more they departed the better they did. Uninformed, unsophisticated (although often well-intentioned) projects needed much adaptation to be successful. On the other hand, the DESSI study found the key components of well-defined, much-used practices being used by teachers who had received significant amounts of training and assistance. Where field researchers found faithful replications, they found robust efforts to improve classroom practice. Where

they found great departures from the practices, they found relatively little change overall, and often frustrated, burned out, or "unreached" school staffs.

Note that I am saying that we are getting better at effectively changing schools, not that we're always successful. The ingredient of clearly defined innovations, which teachers are well trained to implement, and are expected to use in their classrooms, moves us a major step closer in our search for successful strategies.

Perhaps I go far beyond the data when I say that these studies do not contradict each other, but instead show a positive growth in our understanding of how to improve schools. Nor do I find their different approaches to defining fidelity and examining adaptations troubling, because they too describe a growth: this time in learning how to look carefully at new practices in schools. These parallel developments -- in school improvement strategies and in measurement of same -- have complicated our understandings of what we really know. But the complications are worth sorting out, since the future of education may in some ways depend on it.

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